II ELECTRICAL ENGINEERS-SINGAPORE CHAPTER

3rd Technical Webinar 2024

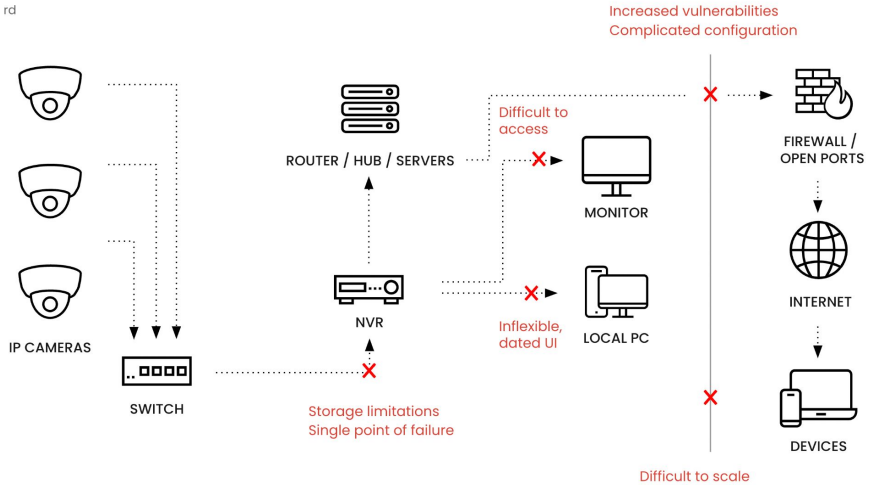
Introduction to Hybrid Cloud Security

Making the world more secure using a sustainable approach to Physical Security.

Adrian Tchordjallian
Enterprise Solution Engineer APAC
Verkada

"IIEE@49: Transformational Leadership Towards Sustainable Development and Global Recognition"

Historically Physical Security is an on-prem thing



Traditional Camera Traditional Setup

Difficult to Access & Share Footage (on prem only)

Proliferation of on-prem hardware

Out of date / poor cyber security

Upkeep & Maintenance is complex & expensive

Companies and Governments trust large service providers with their critical data.

Which do you think is more secure?

Benefits of a cloud-first approach

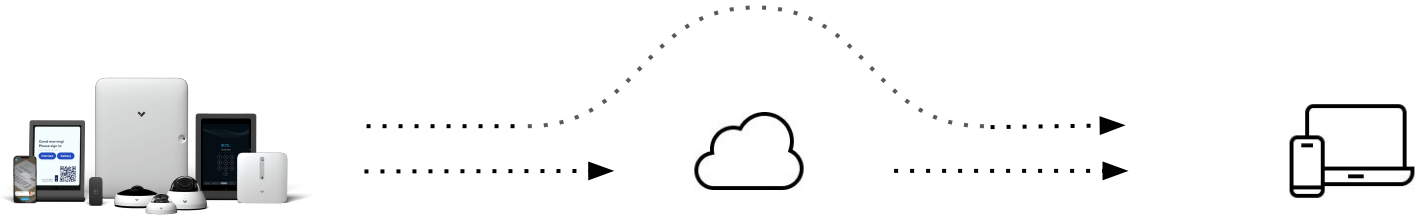
A more sustainable footprint (Energy Savings at Scale)
Less architecture to Manage
No need to handle the security of the security
Secure Access from Anywhere
Ability to get lots of nines in terms of SLAs
Unlimited Scale
And many more....

Lack of intercompatibility

Lots of brands
Do your cameras talk to your visitor management system?
How do you keep everything up to date?
Is it possible to access these systems on a single pane of glass from anywhere in a secure manner?

An Hybrid Cloud Security Solution

The reliability of solid-state storage,
with the accessibility of the cloud.



Security Products

Cloud

Devices

Reliable Security

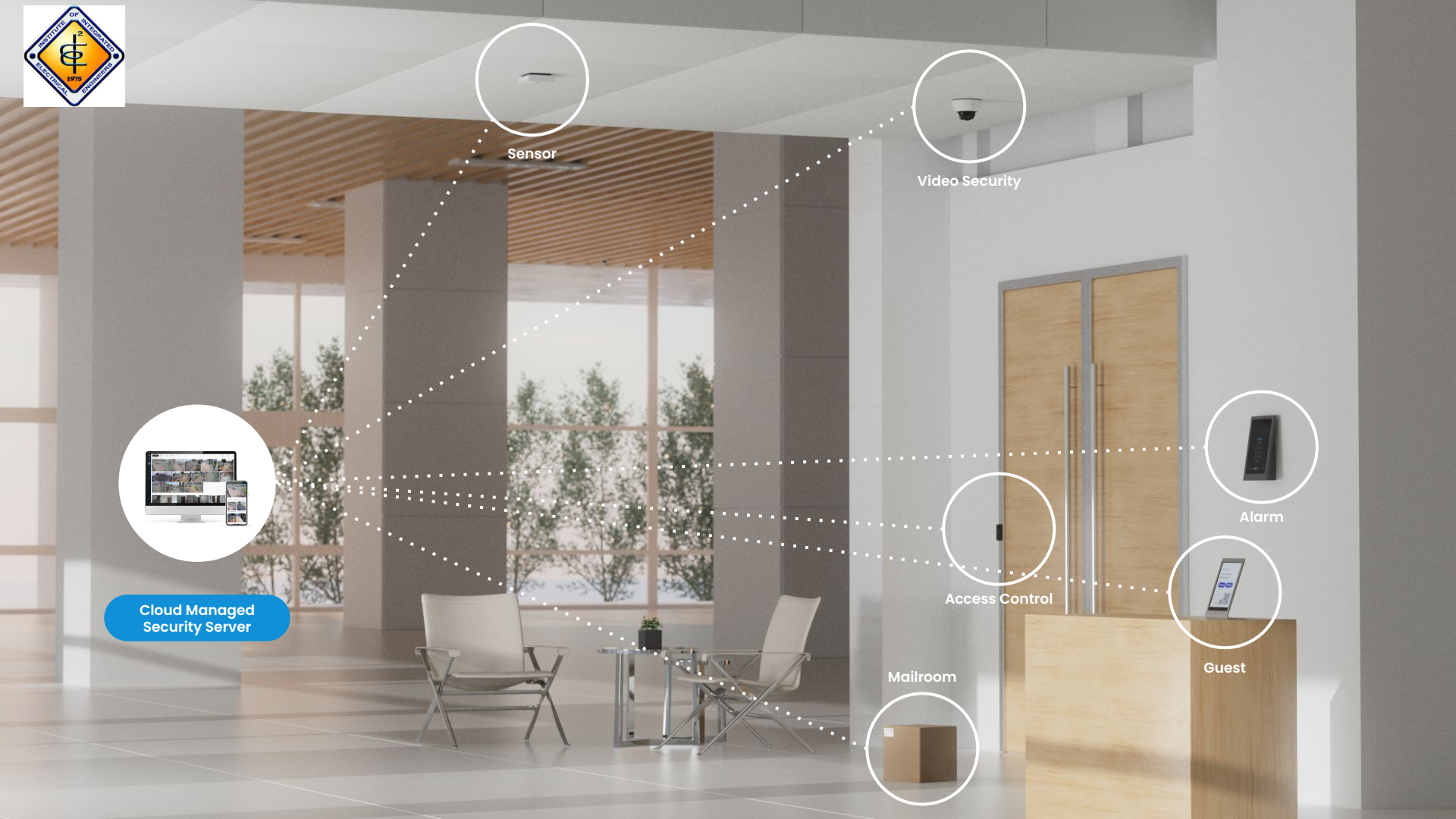
Ecosystem of hybrid cloud devices capable of local storage and offline operation.

Limitless Scale

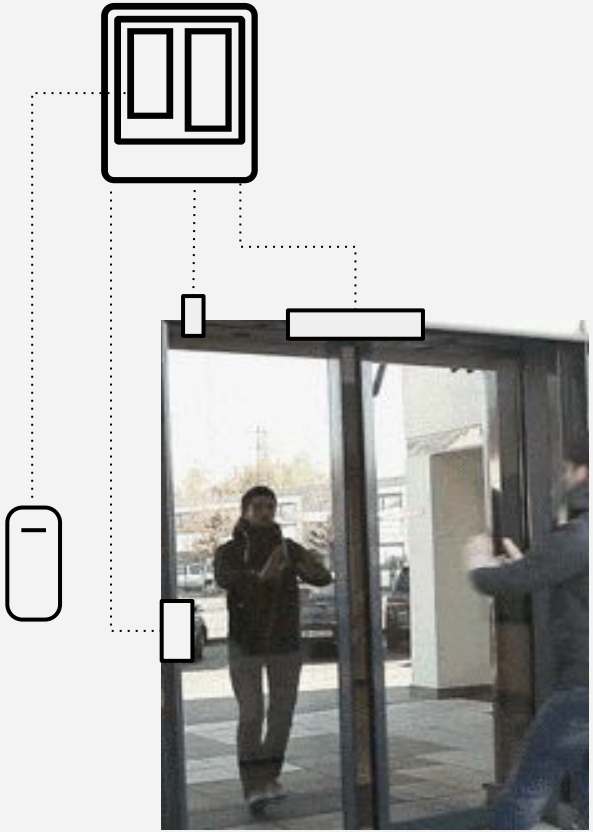
At just 20-50 kbps, increase coverage across your organization without limitations.

Monitor from Anywhere

Deep analytics processed in real-time for instantaneous insights from any device.


Sensor
Video Security
Alarm
Access Control
Guest
Mailroom
Cloud Managed
Security Server

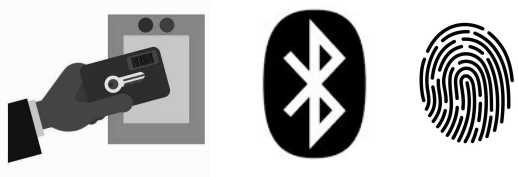
A Focus on Access Control



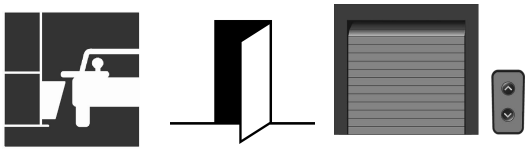
What is Access Control?

Ability of people or vehicles to enter a protected area by means of **authentication** and **authorization** at access control points.

Authentication



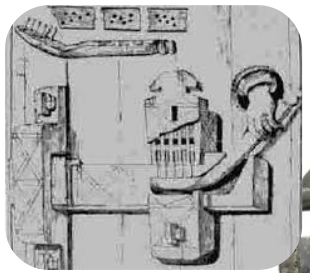
Access Control Points



All buildings have access controlled doors whether it be just lock and key or card readers, fobs, and electrified door locks. Common places we see this include schools, hotels, banks, prisons, and all other enterprise buildings.

Pre-electronic Access Control: History

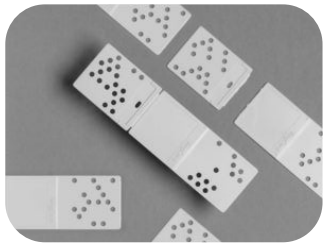
4000 BCE — Wooden locks



10th Century — Metal locks

1848 — Modern Pin and Tumbler – Linus Yale Sr.

1975 — Punch Card Technology – Tor Sornes



1980s — Electrified "magstripe" cards

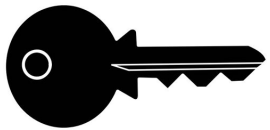
2000s — RFID – Current standard (Wiegand)

2010s — Biometric, Bluetooth, and NFC

Mechanical vs. Electronic Access Control

Mechanical

- **Lack of Security**
  - Key use cannot be tracked
  - Tumbler Locks can be picked
  - Lack of door state tracking
- **Complex Management**
  - Access cannot be restricted to certain times
  - Individual keys can't be easily revoked
  - Losing a Master key = replace all key'd locks



Electronic

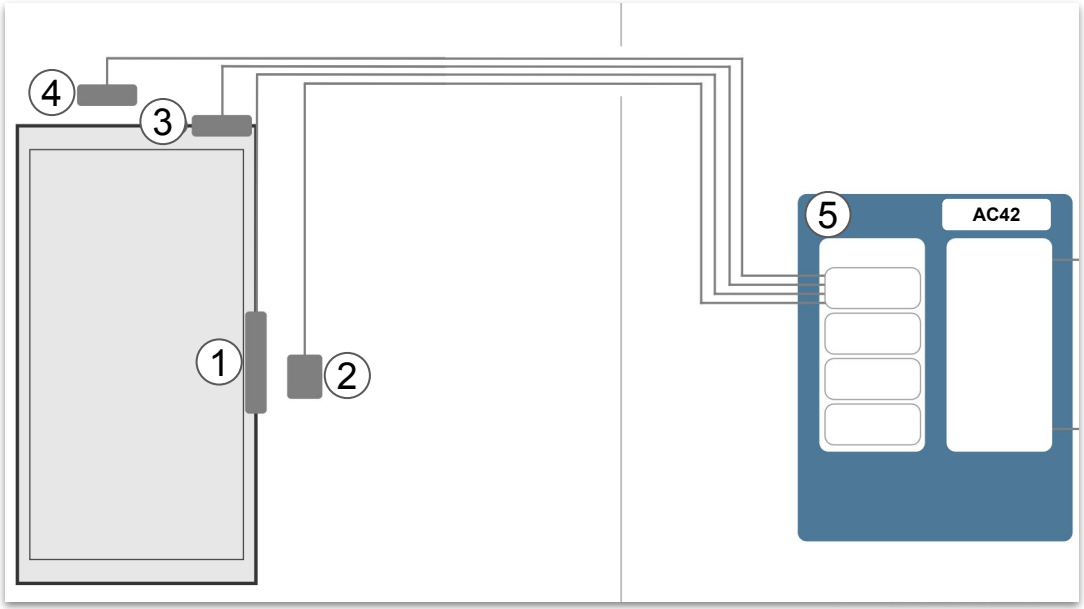
- **Increased Security**
  - More granular permissioning
  - Events can be logged and tracked
  - Alerts and Notifications = faster response
- **Simplified Management**
  - Can easily grant/revoke access
  - Role Based Access Control
  - Automated provisioning

AC Components

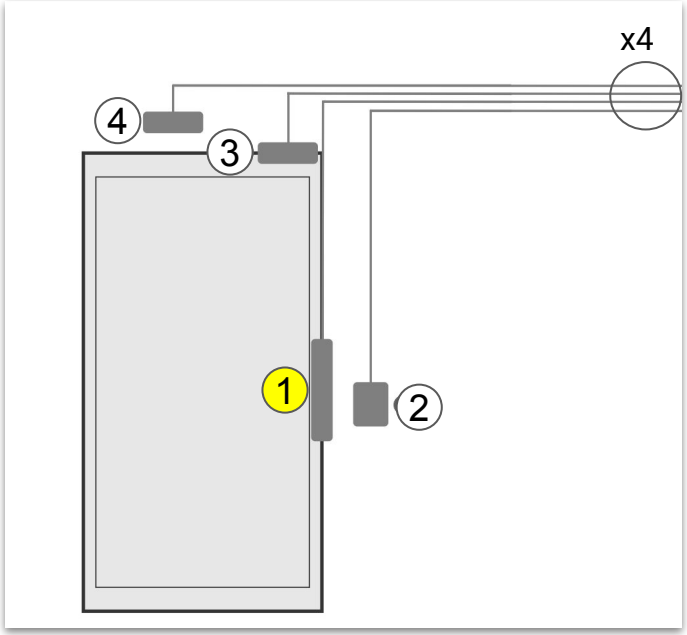
AC Components: Access Control Panel

The access control panel is the brain of the system.
Logic and processing lives here.

We'll come back to panel in a bit...



AC Components: Door Lock



Electrified Doors

In order for Verkada Access Control to work, doors must be electrified. This allows a “Door Controller” to lock/unlock a door. Verkada Access is compatible with all DC powered locks.

Electrified Door Strikes

Wireless Locks

Mag Lock

Electrified Door Handle

Crash / Panic Bar

AC Components: Fail Safe vs. Fail Secure

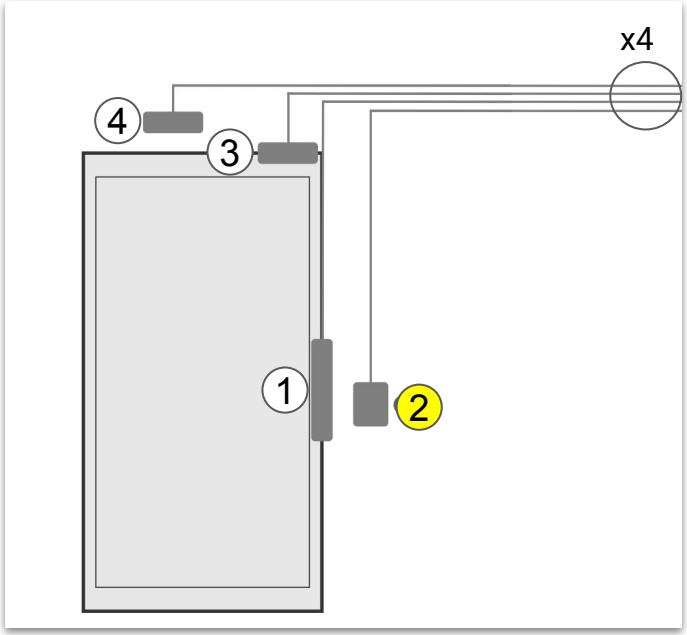
Fail Safe (Normally Closed Circuit)

- Unlocks when power drops
- Free travel in the event of an emergency
- Requires electrical power to remain locked
  - Often paired with external power
- Examples:
  - Mag Locks

Fail Secure (Normally Open Circuit)

- Locks when power drops
- Used to secure rooms with sensitive data
  - Server rooms, Bank Vault
- Examples:
  - Crash Bar, Door Strike

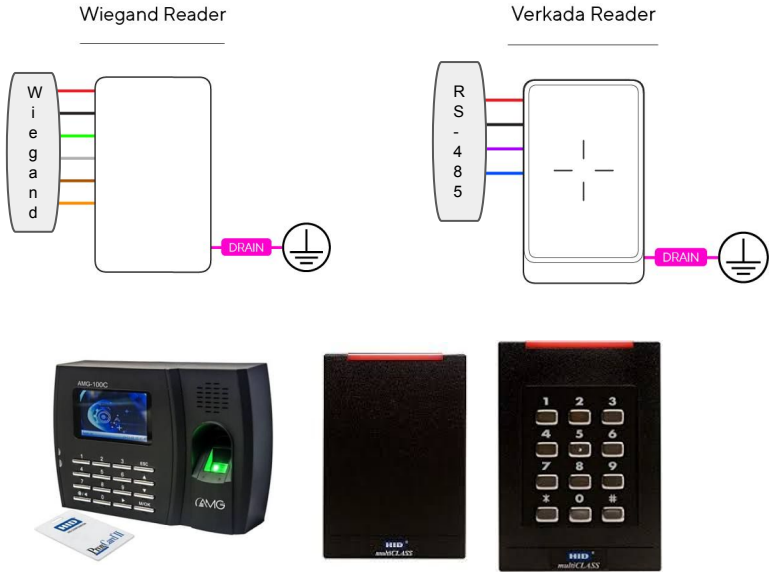
AC Components: Reader



Reader

What reads in the credential at the point of entry

- Credential passed along data lines to controller



AC Components: Types of Readers & Credentials

The type of reader is dependent on the type of credential!

Reader

Credential

Reader

Credential

Reader

Credential

Reader

Credential

Proximity RFID	Biometric	Magstripe	Bluetooth

AC Components: Credential Formats

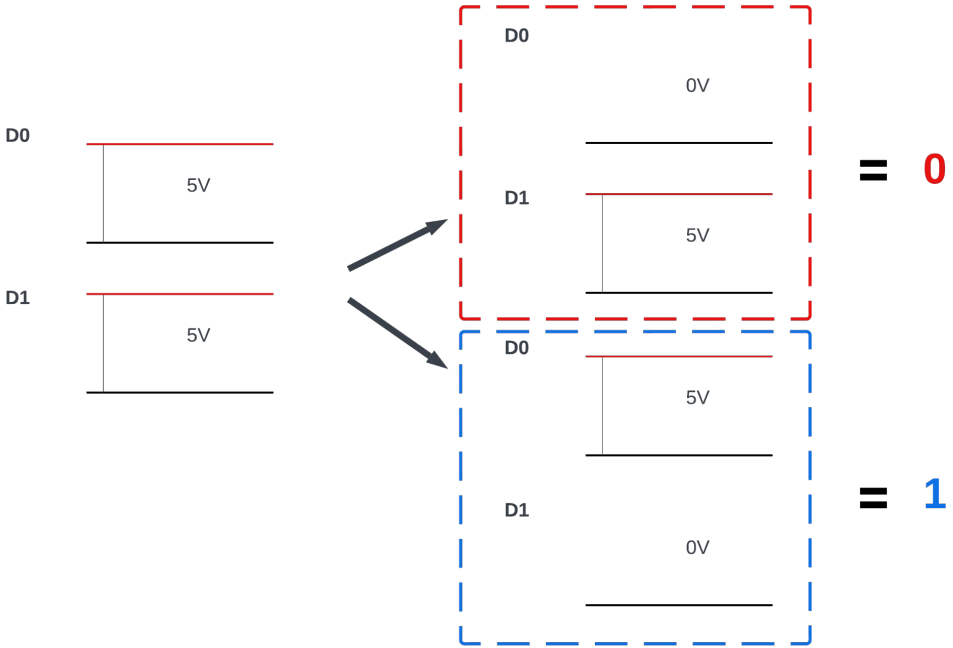
- Credential formats are comprised of a series of bits (e.g. 26, 37, 40)
- Format broken into two:
  - **Facility/Site Code**
    - Similar to an area code
  - **Card Number**
    - Unique identifier
- Standard 26-bit H10301 – **most common format**

"Standard" 26-Bit Wiegand Format
Leading Parity Bit (Even)
Facillity Code (8 Bits)
P FFFFFFFF NNNNNNNNNNNNNNNN P
Trailing Parity Bit (Odd)
Card Number (16 bits)

Wiegand vs. RS-485: Wiegand

Data Wires

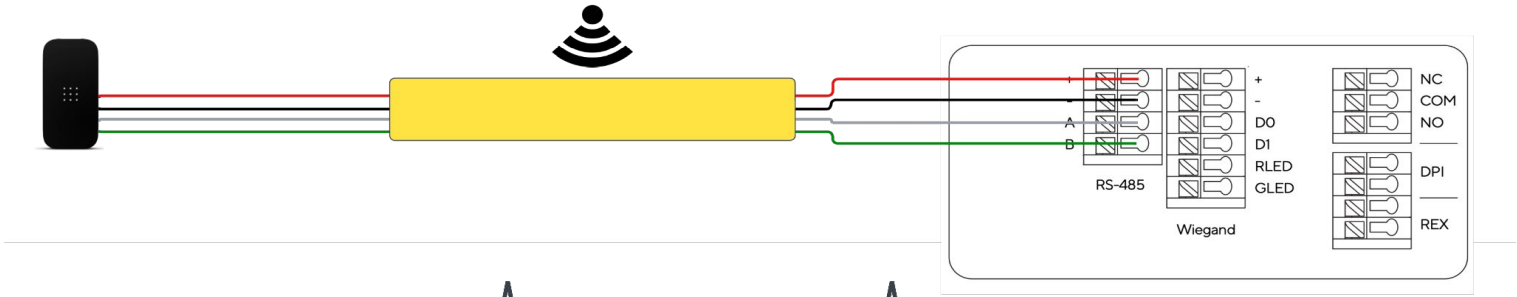
- Both D0 and D1 are pulled to high when no data is being sent
- When 0 is transmitted -> D0 is pulled low
- When 1 is transmitted -> D1 is pulled low

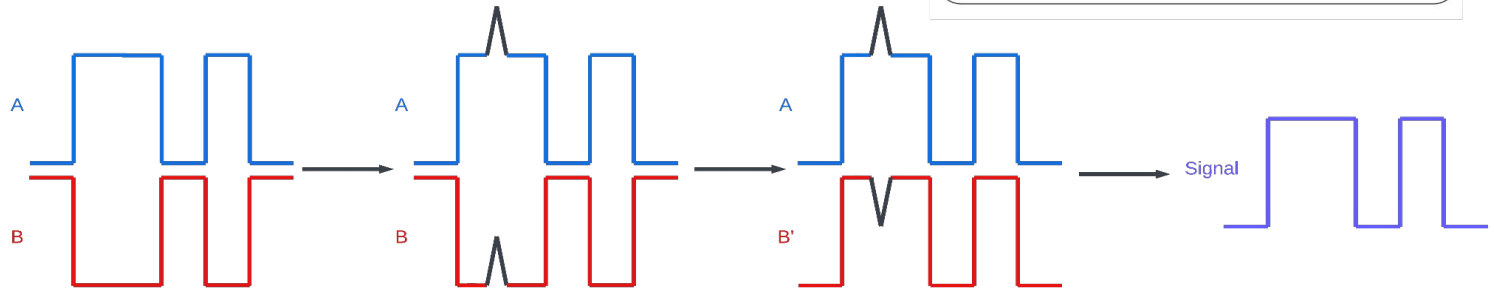


Wiegand vs. RS-485: RS-485

Data Wires

- A is the normal signal
- B is the normal signal **inverted**
- The device on each end compares the delta between the two data lines to reconstruct the signal





Wiegand vs. RS-485

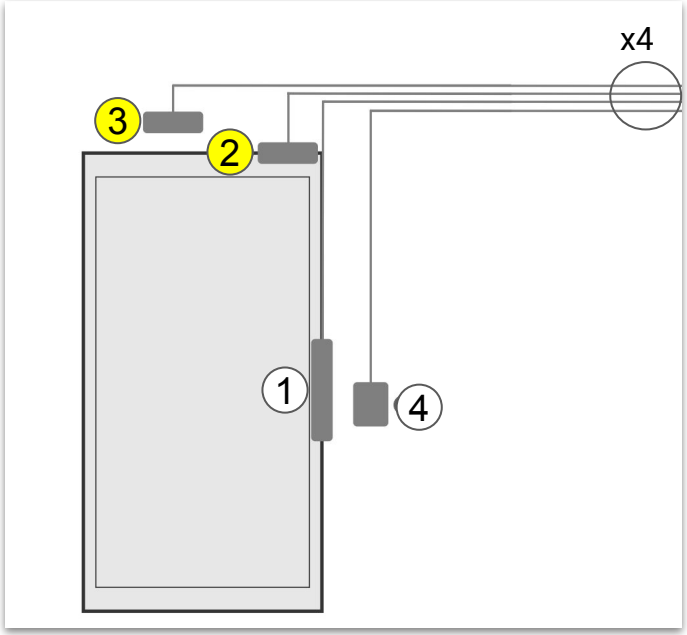
Wiegand

- Unidirectional communication
  - Reader passes credentials to controller
- Can use unshielded cable
- 6 wires
  - +, -, D0, D1, GLED, RLED

RS-485

- Bi-directional communication
  - Push firmware updates to the reader
- Must be shielded cable
- 4 wires
  - +, -, A, B

Electrified Doors: Sensors



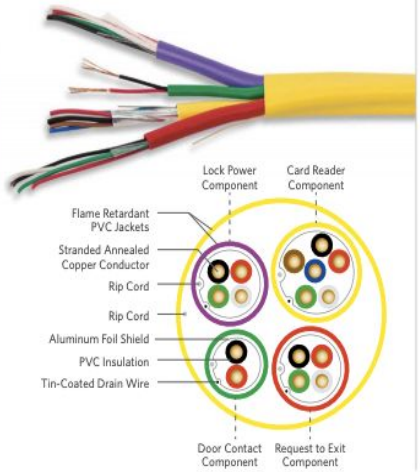
Contact Sensor (DPI)

Contact Sensor that indicates if the door is Open or Closed. *This component is also known as the Door Position Indicator (DPI)*
Verkada offers the BR12 and BR13 (5 pack)

Request to Exit Sensor (REX)

The REX sensor allows the system to know if someone is behind the door. Most often this is an IR (motion) sensor. *eg. doors at a grocery store*

AC Components: Trunk Cable



PRODUCT DESCRIPTION

The Access Control Composite series combines four components that are required for card reader/keypad, door contact, request to exit and lock power device connectivity in a single cable. These composites are offered with an option to shield all components or just the single card reader component. Both riser and plenum jacket constructions are available.

APPLICATIONS

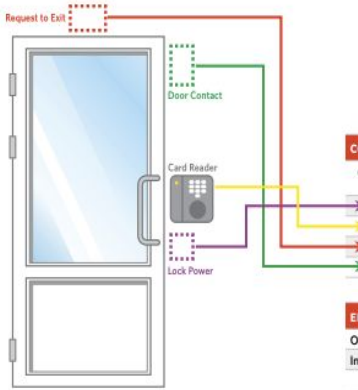
- Access control

FEATURES

- Four components in a single jacket
- Twisted pair in card reader component
- Jacket rip cord
- Overall shield (where applicable)
- QuickCount marking system in feet and meters

BENEFITS

- Save labor costs with a one cable run
- Satisfies requirements of RS-232 and RS-485 protocols
- Easy to open; saves cable preparation time
- Electromagnetic Interference (EMI) protection
- Provides remaining length of cable on spool resulting in less scrap

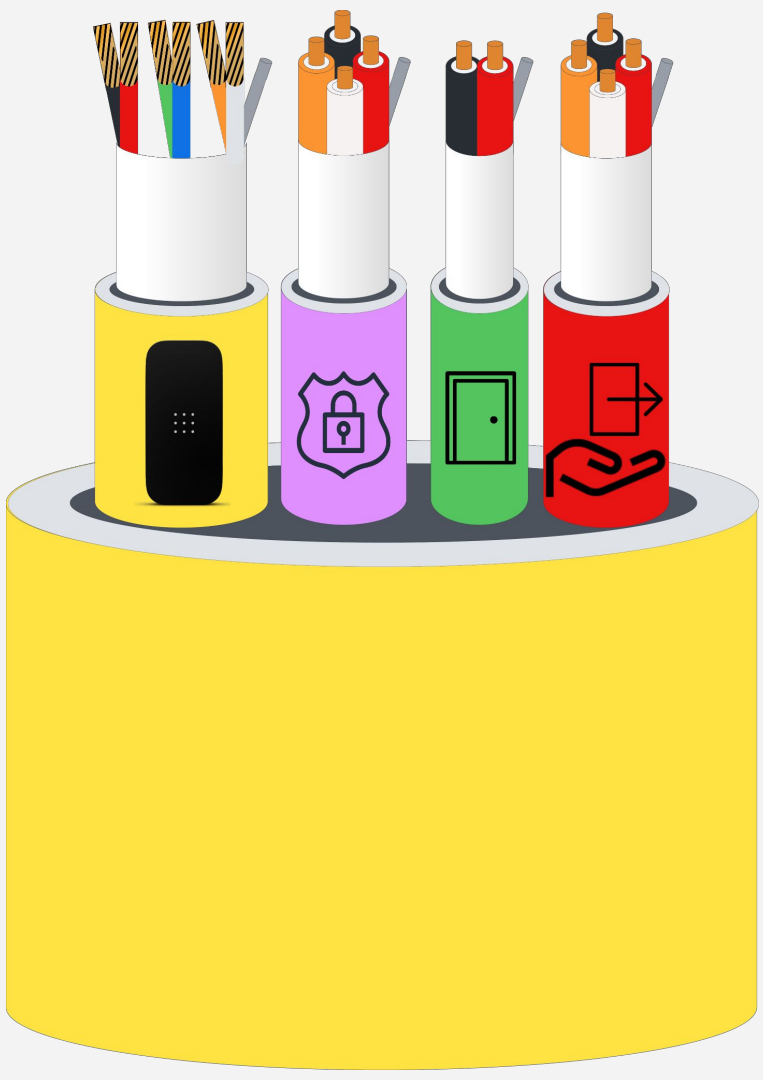


COMPONENT COLOR CODING AND APPLICATION

Component Number	Cable Type	Application	Component Jacket Color
1	18 AWG x 4 conductors	Lock Power	Purple
2	22 AWG x 3 twisted pairs	Card Reader	Yellow
3	22 AWG x 4 conductors	Request to Exit	Red
4	22 AWG x 2 conductors	Door Contact	Green

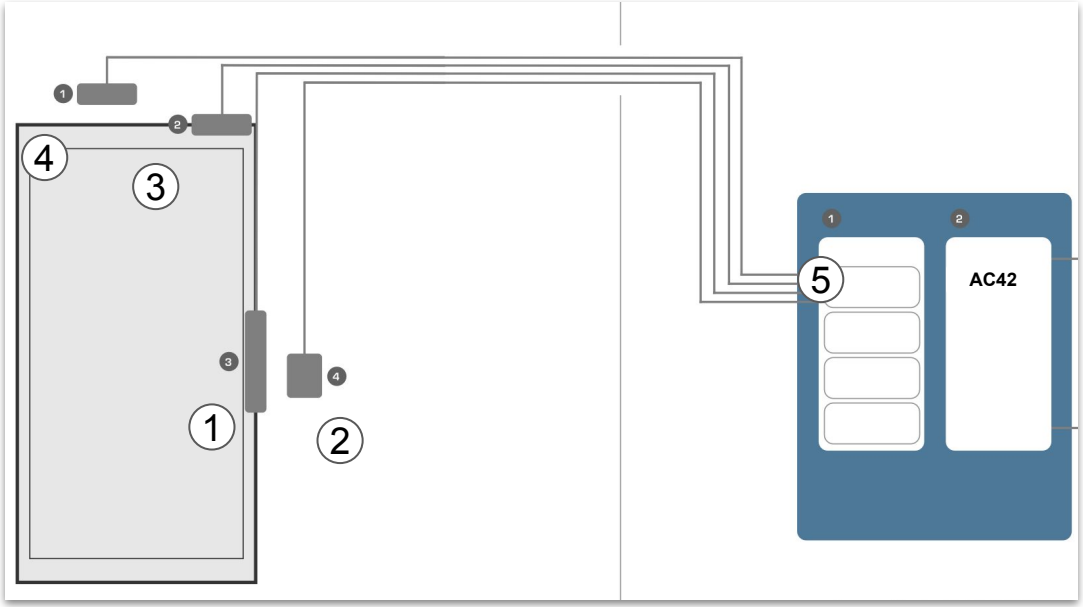
ENVIRONMENTAL SPECIFICATIONS

Operation	-4°F to +167°F (-20°C to +75°C)
Installation	+32°F to +149°F (0°C to +65°C)



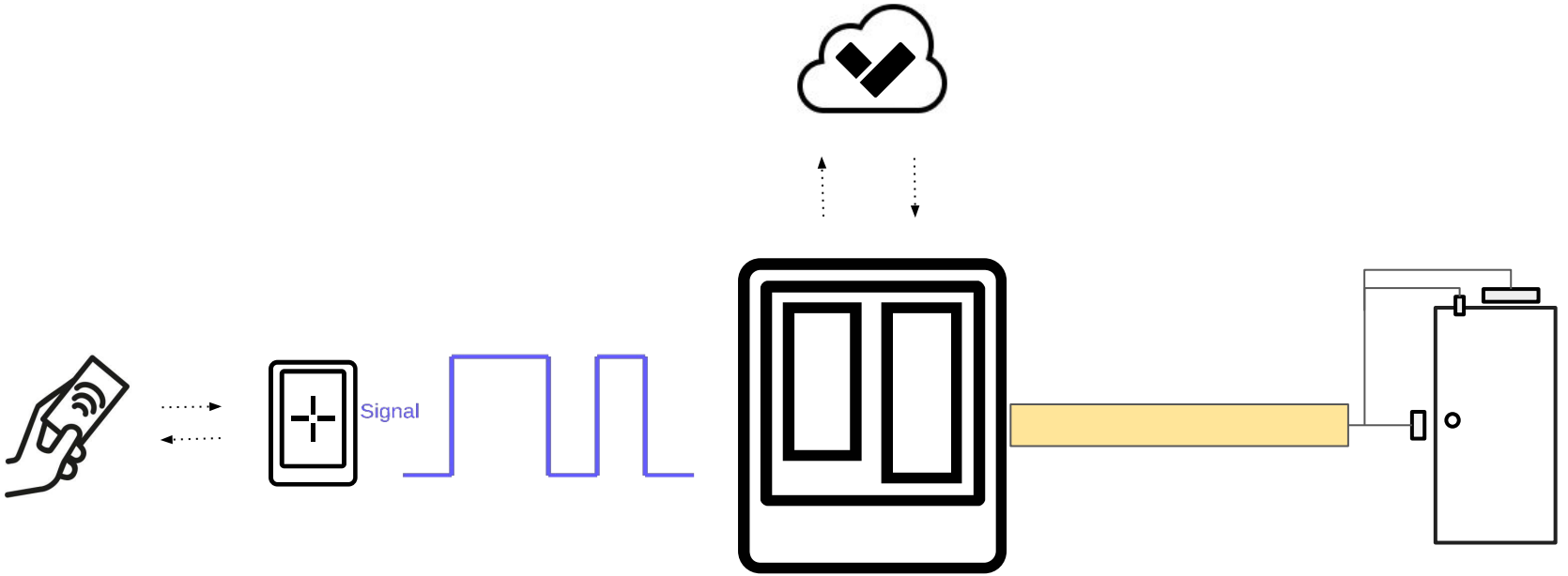
AC Components: Access Control Panel

Remember, the Panel is the Brain!

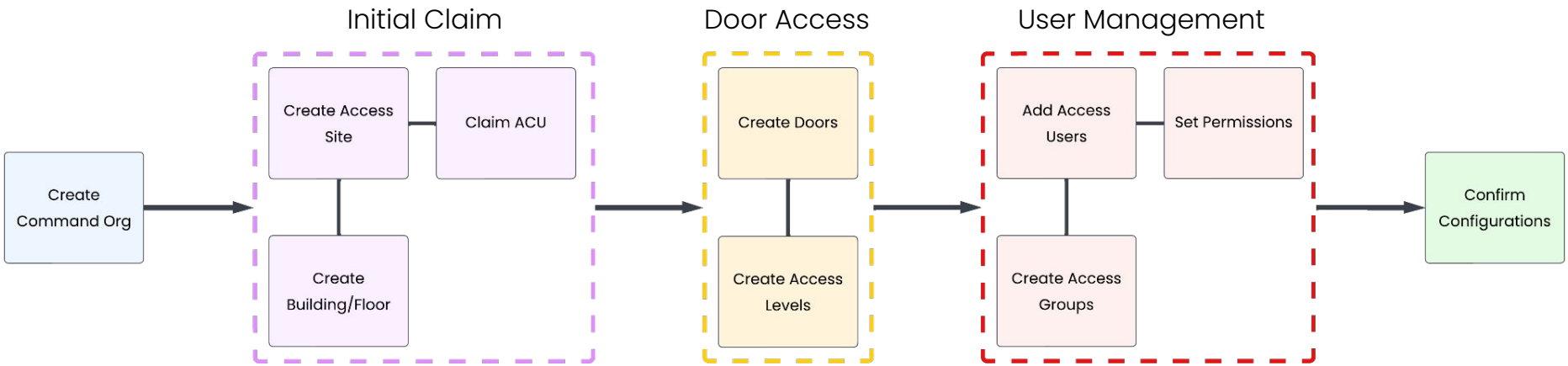


- Decides whether or not to grant access
- Wiring from each door must lead back to the central controller
  - **Home-Run Wiring**
  - Legacy systems offer sub-controllers
- In Singapore Single Door Controllers are a key alternative to simplify rollouts.
- Credentials can be cloud-managed
  - Easy to add or remove users remotely

AC Unlock Flow in a Hybrid Cloud Approach

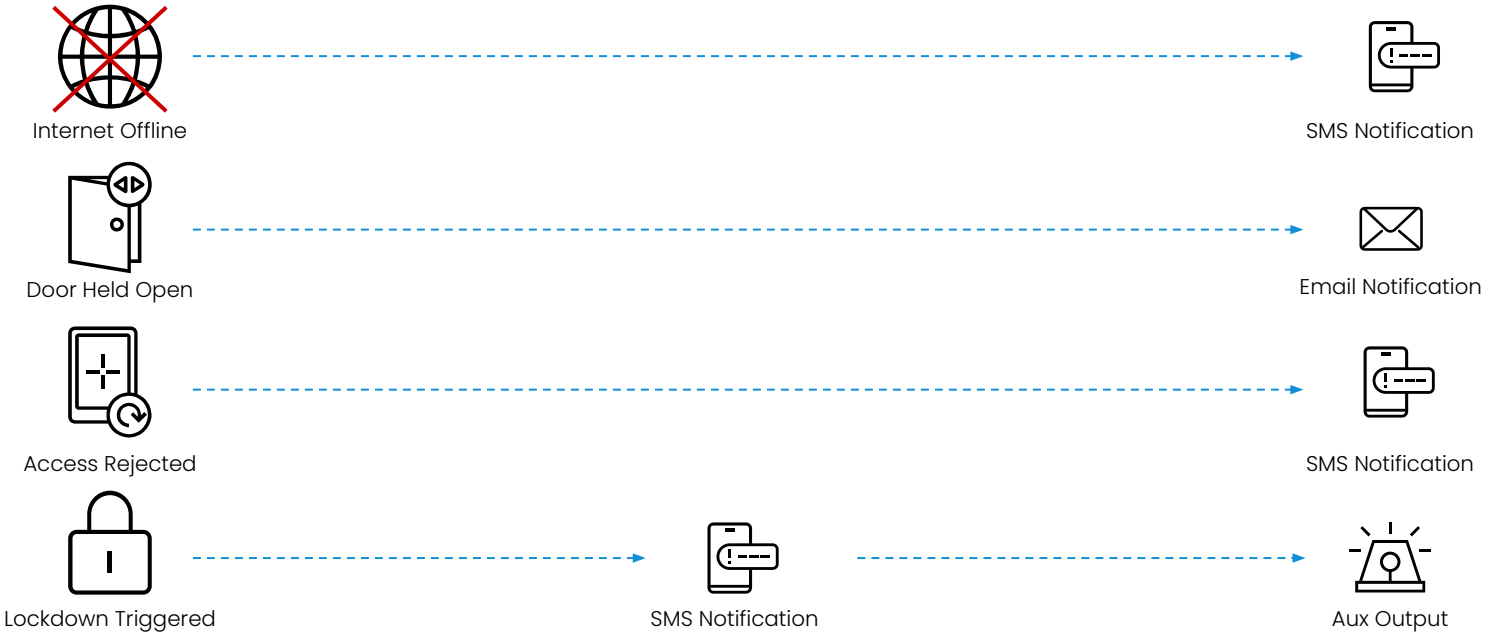


AC Software Environment



Getting Notified for key events

With a Hybrid Cloud Approach, it is possible to get real time alerts



SCIM User Management - Automatic user management

Method of tying the customers existing IT user management system (Azure/Okta) with your Hybrid Cloud Access Control Solution.

- Automate the following actions
  - Provisioning new users and groups
  - Deleting/Deactivating Users
  - Group Assignments

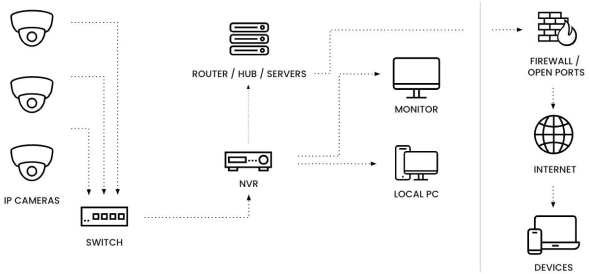
And this applies to all your security products

CCTV Cameras (Access to advance AI capabilities)
Alarms (Ability to get footage video verified based)
Environmental Sensors (Find the suspects for the alerts)
Guest Management (Automate invitations and give access)
Mailroom (Find who took the wrong parcel)

Traditional Approach - Disparate Systems

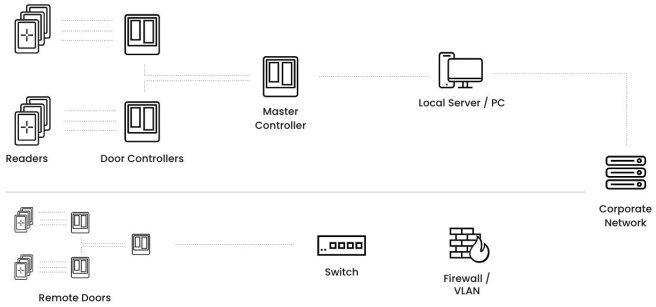
Traditional Camera System Architecture

Bulky, expensive, and hard to maintain and scale



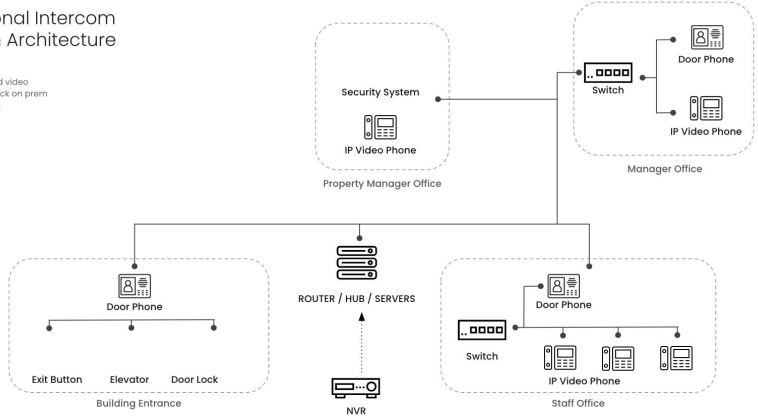
Traditional Access Control Architecture

Bulky, expensive, and hard to maintain

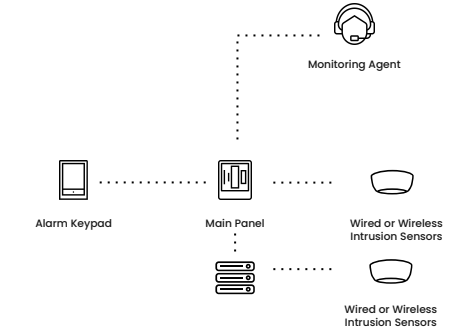


Traditional Intercom System Architecture

Call routing and video recording is stuck on prem and on network



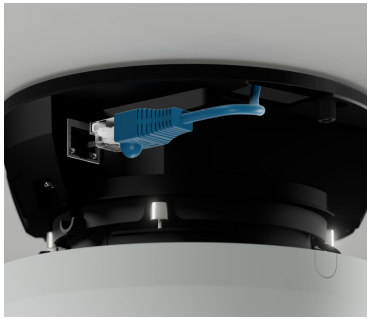
Traditional Alarm Monitoring System



Traditional Environmental Sensors

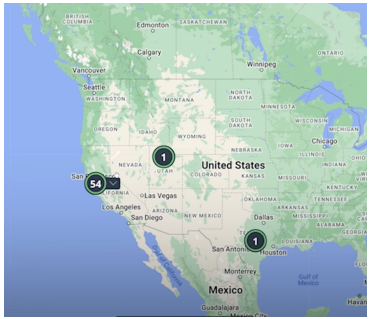
Traditional Guest Check-in System

A quick work about Verkada



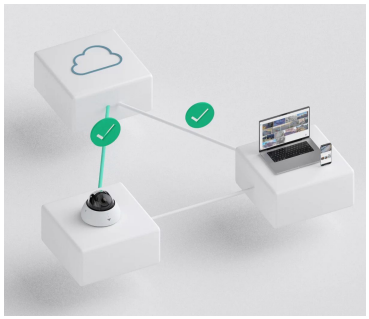
Simple to Install, Use & Maintain

- No NVRs/Servers to manage
- No configurations needed
- Web & mobile based software
- Automatic firmware updates
- 24/7 cloud-based support
- 10-Year warranty



Scale with Ease

- Plug and play via PoE
- Bandwidth friendly footprint
- Unlimited devices & users across all sites
- Site and role based access
- Manage and access remotely

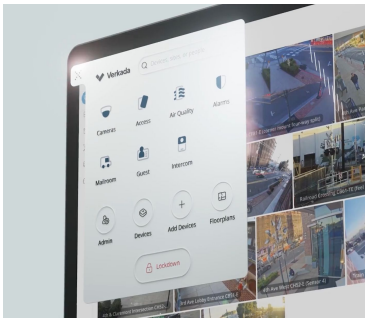


Simplify Security

- SOC2 Type2 compliant
- MFA, SSO and SAML integrations
- Encryption at rest and in-transit
- Outbound connections only

Continuously Getting Smarter

- AI-powered analytics
- New features roll out
- Notification center with live & system health alerts



One Platform for Physical Security

- Single pane of glass
- Integrated features across devices
- APIs, automation & Integrations
- Single vendor footprint

Key Verkada Benefits

10-year product warranty

Lower 10 year TCO

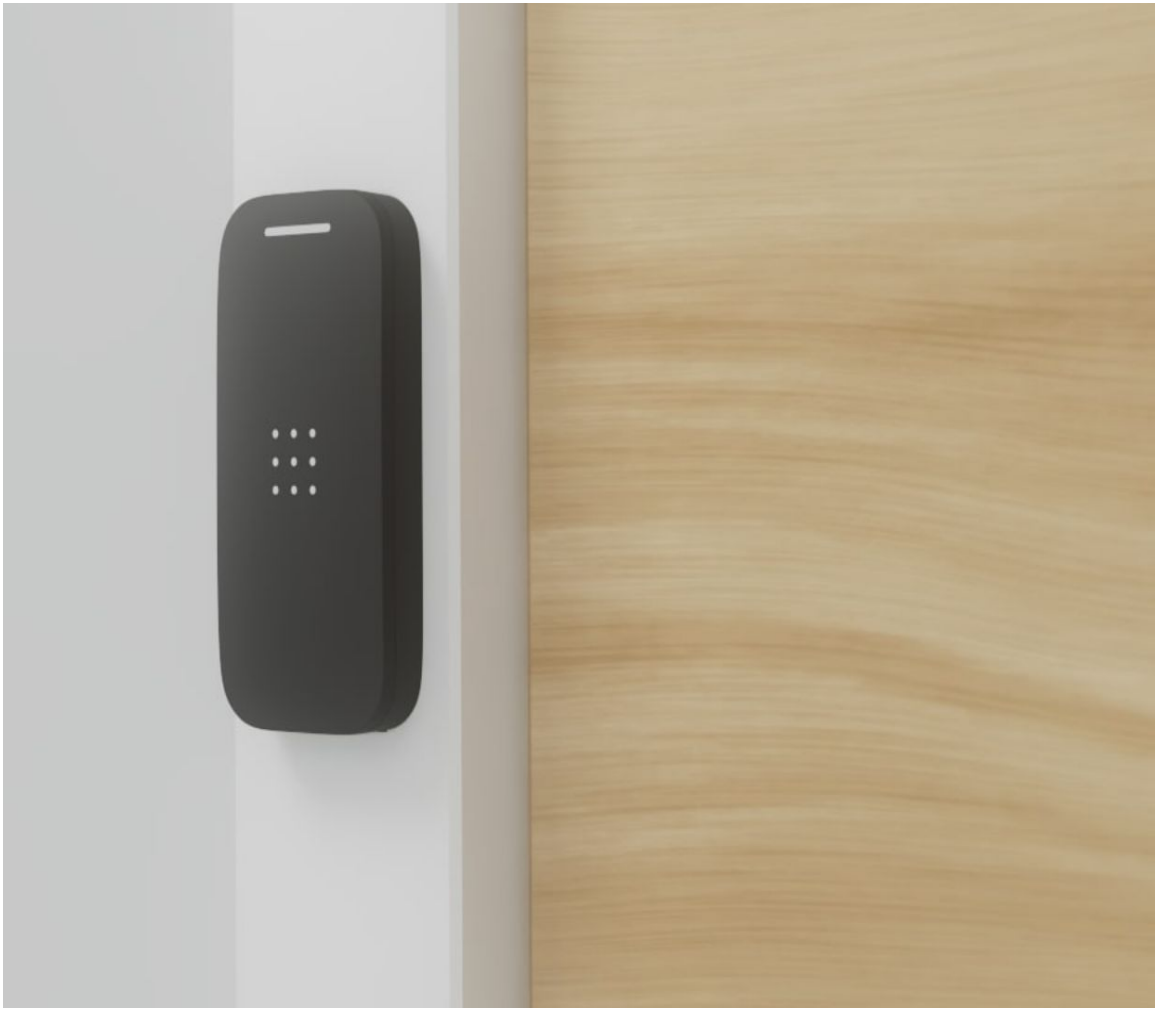
No storage infrastructure

Automatic firmware & software updates

24/7 Technical support

Unlimited users

https://www.verkada.com/support-stats



Demonstration of a Hybrid Cloud Physical Security System

II ELECTRICAL ENGINEERS-SINGAPORE CHAPTER
3rd Technical Webinar 2024

Adrian Tchordjallian
Enterprise Solution Engineer APAC
Verkada

Thanks for your time
Feel free to get in touch on LinkedIn

"IIEE@49: Transformational Leadership Towards Sustainable Development and Global Recognition"